

WHAT IS CLAIMED IS:

1. An apparatus for coding a moving image, comprising:

a coding unit configured to generate a code of each frame of the moving image;

a first verification unit configured to calculate a first code quantity predicted to be stored in a buffer if the code were to be supplied to the buffer in a virtual decoding apparatus by a first bit rate;

a second verification unit configured to calculate a second code quantity predicted to be stored in the buffer and a change rate of the second code quantity if the code were to be supplied to the buffer in the virtual decoding apparatus by a second bit rate lower than the first bit rate; and

a control unit configured to change a coding bit rate of said coding unit based on the first code quantity, the second code quantity, and the change rate.

2. The apparatus according to claim 1, wherein said control unit controls said coding unit not to code all or a part of one frame if the first code quantity satisfies a predetermined

condition.

3. The apparatus according to claim 2,  
wherein the predetermined condition is that a possibility of underflow of the buffer is high based on the first code quantity, and

wherein the one frame is a next frame to the present frame from which the code is generated.

4. The apparatus according to claim 1,  
wherein the first bit rate is the highest value of input bit rate to the buffer of the virtual decoding apparatus.

5. The apparatus according to claim 1,  
wherein the second bit rate is a target value of average bit rate of the code generated from said coding unit.

6. The apparatus according to claim 1,  
wherein said coding unit executes compression coding with quantization.

7. The apparatus according to claim 6,  
wherein said control unit calculates a code quantity to be assigned to one or a plurality of

frames based on the second code quantity and the change rate, determines an upper limit and a lower limit of a quantization scale as a parameter of a coding level based on the first code quantity, the second code quantity and the change rate, and changes the quantization scale of said coding unit based on the code quantity, the upper limit and the lower limit.

8. The apparatus according to claim 7, wherein said control unit corrects the upper limit upward if the first code quantity is below a first threshold, calculates an evaluation value based on the second code quantity and the change rate, corrects the upper limit based on the evaluation value if the evaluation value is below a second threshold, and corrects the lower limit based on the evaluation value if the evaluation value is above a third threshold.

9. The apparatus according to claim 7, wherein said control unit changes the quantization scale so that the second code quantity is above the lower limit of the second code quantity.

10. The apparatus according to claim 9,

wherein said control unit changes the lower limit of the second code quantity.

11. A method for coding a moving image, comprising:

generating a code of each frame of the moving image;

calculating a first code quantity predicted to be stored in a buffer if the code were to be supplied to the buffer in a virtual decoding apparatus by a first bit rate;

calculating a second code quantity predicted to be stored in the buffer and a change rate of the second code quantity if the code were to be supplied to the buffer in the virtual decoding apparatus by a second bit rate lower than the first bit rate; and

changing a coding bit rate of the code generation based on the first code quantity, the second code quantity, and the change rate.

12. The method according to claim 11, further comprising:

controlling the code generation not to code all or a part of one frame if the first code quantity satisfies a predetermined condition.

13. The method according to claim 12,  
wherein the predetermined condition is that a possibility of underflow of the buffer is high based on the first code quantity, and  
wherein the one frame is a next frame to the present frame from which the code is generated.

14. The method according to claim 11,  
wherein the first bit rate is the highest value of input bit rate to the buffer of the virtual decoding apparatus.

15. The method according to claim 14,  
wherein the second bit rate is a target value of average bit rate of the code generated.

16. The method according to claim 11, further comprising:

executing compression coding with quantization for generation of the code;

calculating a code quantity to be assigned to one or a plurality of frames based on the second code quantity and the change rate;

determining an upper limit and a lower limit of a quantization scale as a parameter of a coding level based on the first code quantity, the second

code quantity, and the change rate; and

changing the quantization scale of generation of the code based on the code quantity, the upper limit and the lower limit.

17. The method according to claim 16, further comprising:

correcting the upper limit upward if the first code quantity is below a first threshold;

calculating an evaluation value based on the second code quantity and the change rate;

correcting the upper limit based on the evaluation value if the evaluation value is below a second threshold; and

correcting the lower limit based on the evaluation value if the evaluation value is above a third threshold.

18. The method according to claim 16, further comprising:

changing the quantization scale so that the second code quantity is above the lower limit of the second code quantity.

19. The method according to claim 18, further comprising:

changing the lower limit of the second code quantity.

20. A computer program product, comprising:

a computer readable program code embodied in said product for causing a computer to code a moving image, said computer readable program code comprising:

a first program code to generate a code of each frame of the moving image;

a second program code to calculate a first code quantity predicted to be stored in a buffer if the code were to be supplied to the buffer in a virtual decoding apparatus by a first bit rate;

a third program code to calculate a second code quantity predicted to be stored in the buffer and a change rate of the second code quantity if the code were to be supplied to the buffer in the virtual decoding apparatus by a second bit rate lower than the first bit rate; and

a fourth program code to change a coding bit rate of the code generation based on the first code quantity, the second code quantity, and the change rate.